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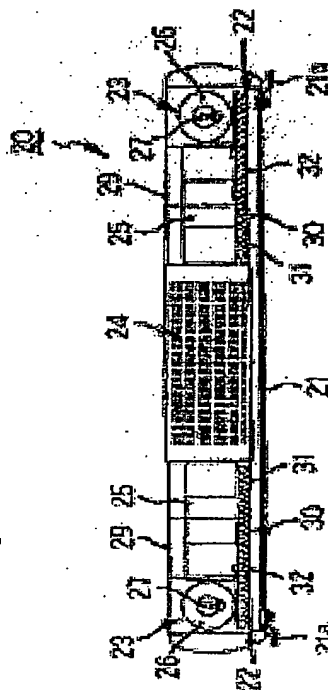
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(54) [Name of the invention] Rotating warning lamp

(57) [Summary] (Revised)

[Purpose] To enhance visibility of the rotating warning lamp.

[Structure] A device configured to substantially enhance the visibility of the rotating warning lamp by causing the LED 32 of an LED luminescence device 30 equipped with a prescribed number of LED 32 and installed on the periphery of base 22 of a rotating warning lamp 20 to blink, or by reflecting the light from the LED 32 in arbitrary directions using a rotating reflective mirror.



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[Scope of Patent Claim]

[Claim 1] A rotating warning lamp consisting of a reflective tube rotated by a motor and lamp placed in this reflective tube and equipped with a rotating lamp made to emit light in a perambulating horizontal direction by rotations of the reflective tube, a base of schematic plates supporting this rotating lamp and a transparent globe that covers the abovementioned base and rotating lamp, where an LED luminescence device comprised of a prescribed number of LED arranged in a strip-like array is installed so that the LED luminescence component faces in a horizontal direction, and the LED luminescence device contains an LED blinking circuit that causes the LED to blink.

[Claim 2] A rotating warning lamp consisting of a reflective tube rotated by a motor and lamp placed in this reflective tube and equipped with a rotating lamp made to emit light in a perambulating horizontal direction by rotations of the reflective tube, a base of schematic plates supporting this rotating lamp and a transparent globe that covers the abovementioned base and rotating lamp, where an LED luminescence device comprised of a prescribed number of LED arranged in a strip-like array is installed so that the LED luminescence component faces upwards, and the LED luminescence device is equipped with an LED blinking circuit that causes the LED to blink and a reflective mirror installed across from the abovementioned LED in the vicinity of the top of the inner surface of the globe for reflecting the blinking light from the LED in the prescribed direction.

[Claim 3] A rotating warning lamp consisting of a reflective tube rotated by a motor and lamp placed in this reflective tube and equipped with a rotating lamp made to emit light in a perambulating horizontal direction by rotations of the reflective tube, a base of schematic plates supporting this rotating lamp and a transparent globe that covers the abovementioned base and rotating lamp, where an LED luminescence device comprised of a prescribed number of LED arranged in a strip-like array is installed so that the LED luminescence component faces upwards, and a reflective mirror installed across from the abovementioned LED in the vicinity of the top of the inner surface of the globe for reflecting the blinking light from the LED in the prescribed direction, and that is equipped with a motor for rotating or oscillating the abovementioned reflective mirror.

[Detailed Description of the invention]

[0001] [Field of Industrial Application] This invention

relates to rotating warning lamps mounted on patrol cars, emergency vehicles, such as ambulance etc., or road service vehicles.

[0002] [Conventional Technology] The rotating warning lamp is mounted on the roofs of patrol cars and other emergency vehicles and road service vehicles, etc., emitting its scattered light signal in a perambulating manner to transmit a warning to other surrounding vehicles and pedestrians.

[0003] The scattered light type of lamps shown in Figures 10 or 12 are examples of this kind of rotating warning lamp.

[0004] This scattered light type of rotating warning lamp (1) is configured with a rotating lamp (4) on a base (3) fixed to both sides of the supporting frame (2) forming the bottom part of the rotating warning lamp, a speaker (5) in the center of the supporting frame (2), a multi-faceted reflective plate (6) between the rotating lamp (4) and the speaker (5) and red, blue, and yellow, etc. transparent globe (7) covering the rotating lamp (4) and the reflective plate (6) reflective plate.

[0005] Also, the abovementioned rotating lamps (4) are configured with halogen, etc. lamps (9) as light sources installed in the center of reflective tube (8) shaped to form 2 seemingly joined symmetrical cup-like shapes, such that the reflective tube (8) is rotated by a drive motor (10) installed on the base (3).

[0006] And, if the reflective tube (8) is rotated by the motor (10) simultaneously with activation of the lamp (9), light is concentrated in the reflecting tube (8) emitting a perambulating beam of directional light in a horizontal direction surrounding the base (3), and the beam of light reflected by the reflective plate (6) is emitted in the forward direction of the rotating warning lamp (1) after it is reflected by the reflective plate (6).

[0007] Additionally, by adjusting the mount position of this reflective plate (6) and the angle of the rotating lamp (4) the light distribution properties of this type revolving warning lamp semi.

[0008] [Problems Solved by the Invention] To improve visibility of the warnings emitted to other vehicles or pedestrians by the rotating warning lamp (1) having the abovementioned structure, in addition to the rotating the reflective tube (8) of the rotating lamp (4) as described above or reflecting the beam of light from the rotating lamp (4) using the reflective plate (6), the most effective method is making the lamp (9) of the rotating lamp (4) itself blink.

[0009] However, since the light (9) in the rotating lamp (4) is incandescent, even if the lamp (9) is made to blink, its blinking is not very sharp and thus cannot be expected to be very effective.

[0010] In addition, in the case of the type of rotating warning lamp (1) mentioned above, since the light emitted from the lamp (9) is cast in a horizontal direction along the periphery of the base (3), light is not emitted in the upward and downward direction of the base (3).

[0011] Therefore, when a rotating warning lamp (1) is attached to the roof of large road service vehicles, downward visibility decreases, or when the service vehicle is used at airports, visibility from the cockpit of an aircraft is poor.

[0012] [Means of Solving the Problem] A rotating warning lamp consisting of a reflective tube rotated by a motor and lamp placed in this reflective tube and equipped with a rotating lamp made to emit light in a perambulating horizontal direction by rotations of the reflective tube, a base of schematic plates supporting this rotating lamp and a transparent globe that covers the abovementioned base and rotating lamp,

[0013], where an LED luminescence device comprised of a prescribed number of LED arranged in a strip-like array is installed so that the LED luminescence component faces in a horizontal direction, and the LED luminescence device contains an LED blinking circuit that causes the LED abovementioned to blink, or

[0014] where an LED luminescence device comprised of a prescribed number of LED arranged in a strip-like array is installed so that the LED luminescence component faces upwards, and the LED luminescence device contains an LED blinking circuit that causes the LED to blink and a reflective mirror installed across from the abovementioned LED in the vicinity of the top of the inner surface of the globe for reflecting the blinking light from the LED in the prescribed direction, or

[0015] where an LED luminescence device comprised of a prescribed number of LED arranged in a strip-like array is installed so that the LED luminescence component faces upwards, and a reflective mirror installed across from the abovementioned LED in the vicinity of the top of the inner surface of the globe for reflecting the blinking light from the LED in the prescribed direction, and that

is equipped with a motor for rotating or oscillating the abovementioned reflective mirror. [0016]

[Mechanism] By causing the LED of an LED luminescence device equipped with a prescribed number of LED 32 and installed on the periphery of the base of a rotating warning lamp to blink, or by reflecting the light from the LED in arbitrary directions using a rotating reflecting mirror, the visibility of the rotating warning.

[0017] [Example of Embodiment] Figures 1 to figure 3 depict the first example of embodiment of the rotating warning lamp (20) in this invention example of embodiment.

[0018] In the same figures, (21) is the support frame that forms the bottom for the rotating warning lamp (20) and (21a) is the mounting bracket attached to the bottom of the support frame (21) for fixing the rotating warning lamp (20) to the roof of a vehicle, etc., (22) and is the base unit fixed on both sides of the support frame (21). (23) is the rotating lamp installed on the outer side of base (22). (24) is the speaker installed in the center of the support frame (21). (25) is the reflective plate installed inside the abovementioned base unit (22). Like the conventional lamp, the abovementioned rotating lamps (23) are configured with halogen, etc. lamps (27) as light sources installed in the center of reflective tube (26) shaped to form 2 seemingly joined symmetrical cup-like shapes, such that the reflective tube (26) is rotated by a drive motor (28) installed on the base (22).

[0019] (29) is the transparent globe covering the rotating lamp (23) installed in the base unit (22) and the reflective plate (25). This transparent globe (29) is colored red, blue and yellow.

[0020] (30) is the LED luminescence device installed on the part opposite the transparent globe (29) in the periphery of the base unit (22). This LED luminescence device (30) consists of a strip-like substrate (31) and prescribed number of LEDs (32) arranged in a strip-like array on the base plate (31).

[0021] And, in this example of embodiment, 2 LED luminescence devices (30) are installed so that the LED luminescence component (32) faces upwards and are mounted to each base 22, and the LED (32) of each of the LED luminescence devices (30) are made to blink by the LED blinking circuits (33) integrated in both of the bases (22).

[0022] Furthermore, using the abovementioned LED

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blinking circuit (33), the LED (32) on the substrate can be made to blink all at once, or to blink sequentially in a flow pattern, and the blink cycle can be made to be regular or irregular.

[0023] The rotating warning lamp (20) mentioned above is mounted to the roofs of emergency vehicle or service vehicle, such that as the reflective tube (26) of the rotating lamp (23) rotates, the lamp (27) also blinks, and the beams of light from the rotating lamp (23) are emitted to the periphery of the rotating warning lamp, while at the same time, the LED (32) of the LED luminescence device (30) are made to blink, emitting blinking light from the LED (32) toward the front of the rotating warning lamp (20).

[0024] At this time, since the blinking light emitted by the LED (32) luminescence component is very sharp, visibility is good, clearly providing notification of the existence of emergency or service.

[0025] Furthermore, since the blinking light of the flasher of LED (32) is emitted with a certain degree of expansion, the blinking light can be emitted even in the upward or downward direction of the rotating warning lamp (20).

[0026] Therefore, regardless of whether the rotating warning lamp (20) is installed on the roof of large sized service vehicles or on the roof of service vehicles used in airports, the blinking light can be made to emanate in the upward and downward direction of the roof.

[0027] The abovementioned example of embodiment explains the example of an LED luminescence device (30) installed on the front of the base (20). However, the LED luminescence device (30) can also be installed on the rear of the base unit (22) or on the external sides of the base (22) to achieve blinking along the entire periphery of the rotating warning lamp (20).

[0028] Figure 4 and Figure 6 depict the second example of embodiment of the rotating warning lamp (20) in this invention. In this example of the rotating warning lamp (20), the LED luminescence device (30) is positioned such that the luminescence components face upward on the periphery of the base (22), and a reflective mirror (35) is installed at a 45° angle in a position opposite the LED luminescence device in a vertical direction near the upper part of the inside surface of the transparent globe (29), such that this reflective mirror (35) can be used to reflect the blinking light emitted from the LED (32) forward. The remaining

parts are the same as that described in the first example of embodiment.

[0029] Note that although the support components of the reflective mirror (35) are omitted in the illustration, these support components can also be formed to integrate, for example, with the globe (29).

[0030] In this way, by using the reflective mirror (35) to emit the blinking light from the LED luminescence device (30) toward the front of the rotating warning lamp (20) it is possible to achieve extremely sharp blinking light emission, thereby enabling improved visibility.

[0031] Note that although in this example of embodiment the reflective mirror (35) is used to emit the blinking light from the LED luminescence device (30) toward the front of the rotating warning lamp (20), the LED luminescence device (30) can also be installed on the rear of the base unit (22) or on the external sides of the base (22), and a reflective mirror (35) can be installed in a position opposite the LED luminescence device in a vertical direction near the upper part of the inside surface of the transparent globe (29) to emit the blinking light from the LED (32) along the entire periphery of the rotating warning lamp (20). [0032] Figure 7 and Figure 9 depict the third example of embodiment of the rotating warning lamp (20) in this invention. In this example of the rotating warning lamp (20), the LED luminescence device (30) is positioned such that the luminescence components face upward on the periphery of the base (22), and a double sided reflective mirror (35') is installed in a position opposite the LED luminescence near the upper part of the inside surface of the transparent globe (29), and this double sided reflective mirror (35') rotate or oscillate using a motor (36). In this example of embodiment, the LED (32) can be left on, and since it is not necessary to make them blink, the structure is not configured with an LED blinking circuit.

[0033] In other words, if the double-sided reflective mirror (35') that rotates or oscillates is used to emit the light from the LED luminescence device (30) out from the transparent globe, when the double-sided reflective mirror (35') is vertically oriented, the light from the LED (32) will be emitted in the upward direction of the rotating warning lamp (20), and when the double-sided reflective mirror (35') is oriented in a non-vertical direction, the light from the LED (32) will be emitted in downward and diagonally in the back to front direction,

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horizontally in the back to front direction, upward and diagonally in the back to front direction of the rotating warning lamp (20) in accordance with the angle of the double-sided reflective mirror (35').

[0034] Note that in this example of embodiment, the LED luminescence device (30) is installed only on the front of the base (22). The double-sided reflective mirror (35') is installed so as to revolve freely in a position opposite the LED luminescence device (3) in the upper part of the inside surface of the transparent globe. Although this structure is configured such that the light from the LED (32) can be emitted in the vertical and back to front directions of the revolving warning lamp (20) using the double-sided reflective mirror (35'), the LED luminescence device (30) can also be installed on the rear and outer sides of the base (22) and the double-sided reflective mirror (35') can be installed so as to revolve freely in a position opposite the LED luminescence device (3) in the upper part of the inside surface of the transparent globe (29) to emit the blinking light from the LED (32) along the entire periphery, including the vertical direction, of the rotating warning lamp (20).

[0035]

[Advantageous Effect of the Invention] As explained above, this invention substantially enhances the visibility of the rotating warning lamp by causing the LED of an LED luminescence device equipped with a prescribed number of LED and installed on the periphery of the base of a rotating warning lamp to blink, thus achieving extremely sharp emission of blinking light to the periphery of the rotating warning lamp, and by causing the blinking light from the LED to be emitted in an expanding fashion.

[0036] In addition, by reflecting the blinking light from the LED using a reflective mirror, it is possible to set the direction of emission freely. And when the reflective mirror is rotated while the LED is on, the light from the LED can be emitted across a broad range, and since it seems from the outside that the light from the LED is blinking, in this case as well, visibility is significantly enhanced.

[Brief Description of the Figures]

[Figure 1] Figure indicating the front view of the first example of embodiment of the rotating warning lamp in this invention

[Figure 2] Two-dimensional view figure of the same rotating warning lamp

[Figure 3] Side view figure of the same rotating warning lamp

[Figure 4] Figure indicating the side view of the second example of embodiment of the rotating warning lamp in this invention

[Figure 5] Front view figure of the same rotating warning lamp

[Figure 6] Two-dimensional view figure of the same rotating warning lamp

[Figure 7] Figure indicating the front view of the third example of embodiment of the rotating warning lamp in this invention

[Figure 8] Two-dimensional view figure of the same rotating warning lamp

[Figure 9] Side view figure of the same rotating warning lamp

[Figure 10] Side view figure of a conventional rotating warning lamp

[Figure 11] Front view figure of the same rotating warning lamp

[Figure 12] Two-dimensional view figure of the same rotating warning lamp

[Description of Codes]

20 Rotating warning lamp
21 Support frame
22 Base unit
23 Rotating lamp
25 Reflective plate
26 Reflective tube
27 Lamp
28 Motor
29 Transparent globe
30 LED
31 Substrate
32 LED
33 LED on/off light
35 Reflective mirror
35' Reflective mirror
36 Motor

Figure 1

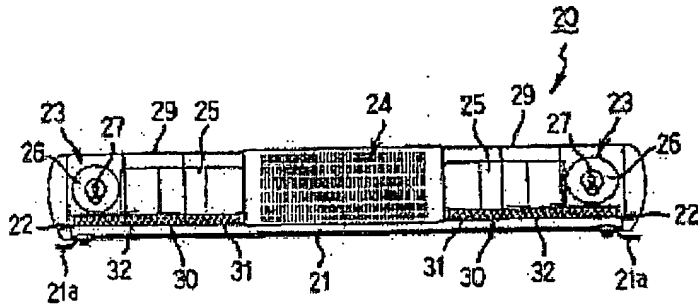


Figure 2

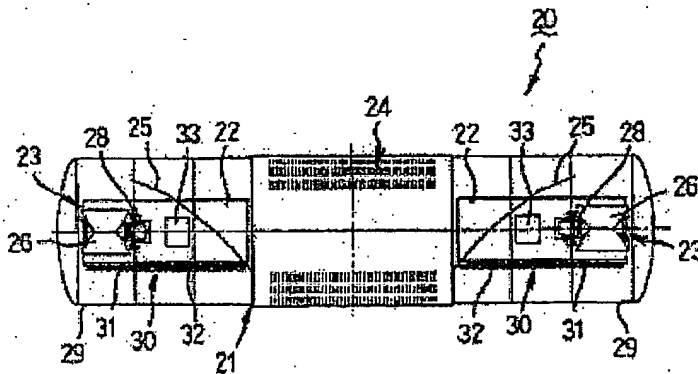


Figure 5

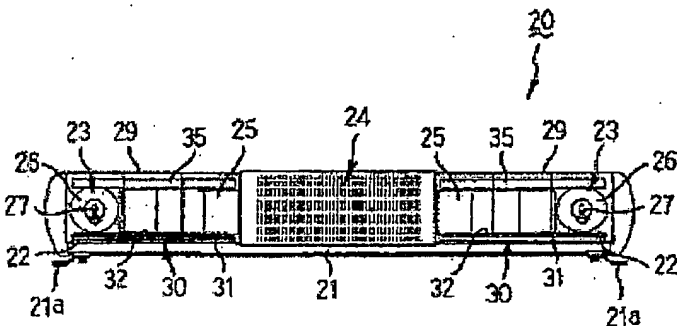


Figure 3

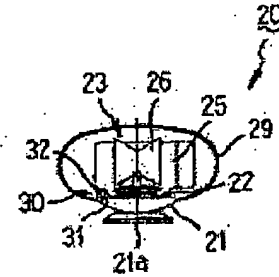


Figure 4

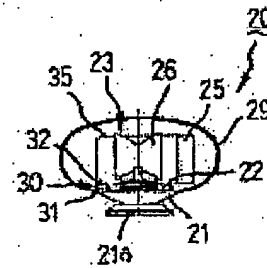
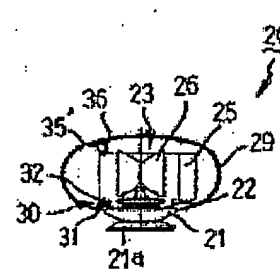


Figure 9



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Figure 6

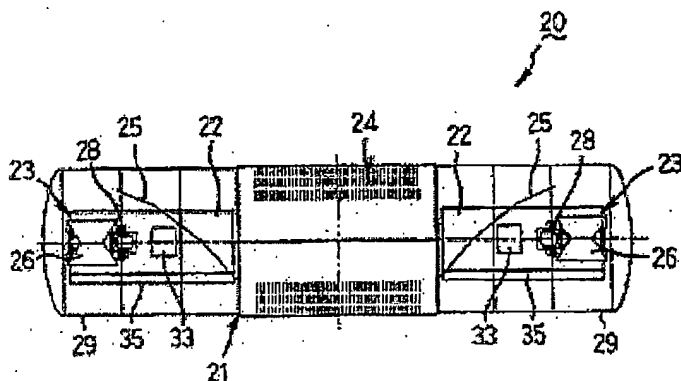


Figure 10

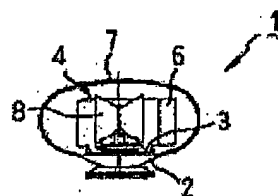


Figure 7

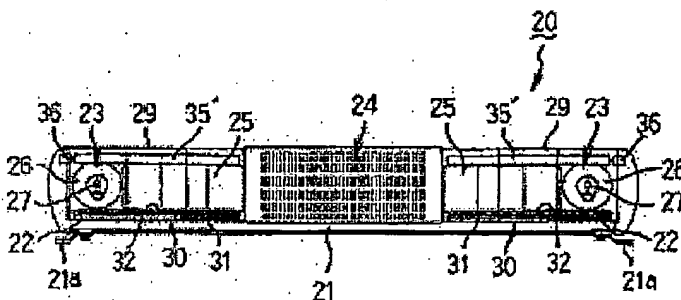
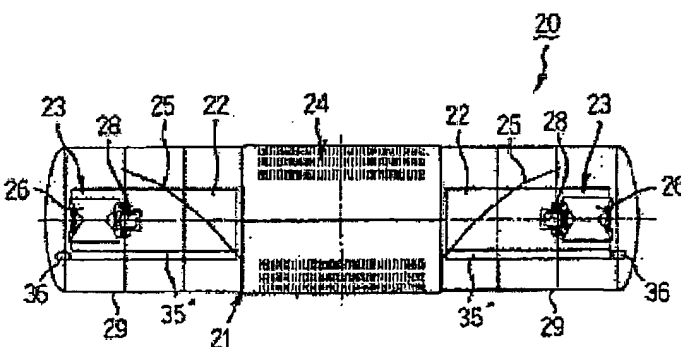


Figure 8



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Figure 11

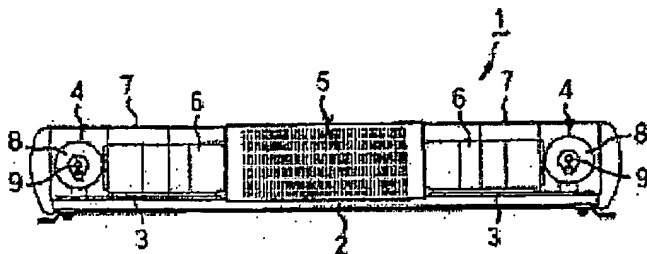
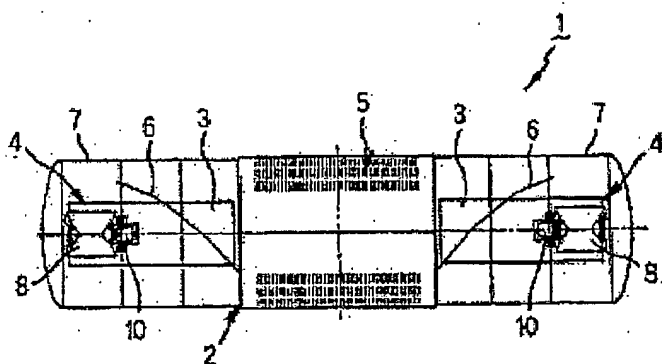


Figure 12



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